

Effect of Listening To Preferred Music on Physiologic Parameters in Patients with Severe Traumatic Brain Injury: A Randomized Clinical Trial

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Abstract: Background and aim: Pain, stress and anxiety is common experiences among critically ill patients in intensive care units. High level of stress and anxiety may be affect critically ill patients hemodynamic situation negatively. In present study, we used music as a non-pharmacologic method with this hypothesis that music distracts patients' attention and decreases their heart rate, blood pressure, body temperature, and respiratory rate.

Material and methods: In a randomized controlled clinical trial, 38 patients who were admitted to ICU because of severe head injury were randomly assigned to group "A" (control group) or group "B" (intervention group). Patients in group "A" received usual care. In addition to usual care, patients in group "B" listened preferred music (music played by MP4 player with special headphones for 30 minutes two time per day (7 am and 18 pm) for two week. Patients' physiologic parameters (heart rate, oxygen saturation, diastolic and systolic blood pressure) were measured with using standard apparatus (S1800-ER model) by researcher (PD) immediately before, immediately after and 30 minute after intervention.

Results: The demographic characteristics including age, sex, marital status and level of education in time of ICUs admission were similar in patients in group "A" and "B" ($p>0.05$). All hemodynamic parameters in present study showed more stability in patients who listened to music in compared to patients in control group. However these differences in all time were not statistically significant.

Conclusion: According to finding of present study, listening to preferred music has not negative effect on critically ill patients' hemodynamic parameter. Music should be considered by clinicians as a non-pharmacological, non-invasive, simple, cheap, safe, and effective method for reliving patients' distress in severe head injury patients in ICUs.

Keywords: Head injury, critically ill patients, ICU, music therapy.

1. INTRODUCTION

Intensive Care Units (ICUs) is specialized ward of a hospital that is different from other wards of the hospital due to the characteristics of their patients and illnesses, their treatment techniques, their physical appearances and emotional environments [1]. Patients who admitted to these wards usually need to advance level of treatment and care. They usually experienced high level of pain, anxiety and stress during ICU admission [2, 3]. According to finding of one study in 2015, of patients to admit to an ICU in India, 75.40%, 62.70%, 26.98%, and 13.49% reported moderate-severe, chronic, and neuropathic pain, respectively [4]. Inadequate treatment of pain in critically ill adults can have significant physiological and psychological consequences [5]. Underdiagnosed and under treated pain in critically ill patients who admitted to ICUs has been linked to a number of adverse outcomes such as increased risk of infection, prolonged mechanical ventilation time, increase risk of delirium, compromised immunity, inhibits healing, increase risk of self-harm and increases the length of ICU stay. Also pain in critically ill patients is associated with acute stress response including changes in heart rate, blood pressure, respiratory rate [6]. For preventing patients distress, clinician usually use pharmacological agent such as sedative and opioid drugs. Also several complementary therapies exist to relief patient's pain, stress and anxiety that is safer than pharmacological methods. Music therapy is one example. According to the American Music Therapy Association definition "music therapy is the clinical and evidence-based use of music interventions to accomplish individualized goals within a therapeutic relationship by a credentialed professional who has completed an approved music therapy program". Music therapy interventions can be used to promote patients wellness, manage patients stress, alleviate patients pain, express patients feelings, enhance patients memory, improve patients and clinician communication and promote patients physical rehabilitation [7]. Although, several non-pharmacologic therapies have been proposed to relieve pain, stress and anxiety in critically ill patients who admitted to ICUs, however in some field such as music therapy there are few studies. In present study, we examined the effect of listening to preferred music on physiologic parameters in critically ill patients with severe head injury.

2. METHODS

This study is a randomized controlled clinical trial conducted from January 2014 to July 2014. This study has received permissions from medical ethics' board of the Kerman University of Medical Sciences. Each patient relative received oral information about study aim and asked to fill in a written consent form. According to sample formula 38 patients who were diagnosed with severe head injury and were hospitalized in trauma intensive care unit of a governmental hospital in Shiraz, Iran invited to participate in present study. Inclusions criteria of the study were: men and women who have severe head injury (GCS between 3 to 8), age between 17 to 60 years. Addicted patient (both drug and alcohol), patients with history of cardiovascular disease, head trauma, depression, chronic pain, delirium and hearing impairment were excluded from study. According to the sample size formula, the sample size determined 38. Eligible patients whom were found at the time of ICU admission, were randomly assigned to group "A" (control group) or group "B" (intervention group) by the head nurses of the ICUs, who chose the next serially numbered sealed opaque envelope containing a simple 1:1 randomization sequence. Patients in group "A", received usual care. In addition to usual care, patients in group "B" listened preferred music (music played by MP4 player with special headphones for 30 minutes two time per day (7 am and 18 pm) for two week. All music pieces were selected by patient's relative under supervision of a musician considering the cultural conditions of the society and with a rate of 60-80 beats per minute and a general absence of strong rhythms or percussion. Changing the music volume was in the control of the researchers. First a check list was designed to obtain demographics information and physiologic parameters. Patients' physiologic parameters (heart rate, oxygen saturation, diastolic and systolic blood pressure) were measured with using standard apparatus (S1800-ER model) by researcher (PD) immediately before, immediately after and 30 minute after intervention. The data was analysed using the Statistical Package for the Social Sciences (SPSS 18). A P-value of less than 0.05 was considered as statistically significant. Descriptive statistics (expressed as mean and standard deviation) and paired t test, independent T- test and one way ANOVA were used.

3. RESULTS

Most Cause of head injury in patients in both group were care accident (17 patients in group “A” and 16 patients in group “B”). The demographic characteristics including age, sex, marital status and level of education in time of ICUs admission were similar in patients in group “A” and “B” (Table 1).

Table 1: Patients demographics characteristics in both groups

Item		Group “A”	Group “B”	P value
Age		29.8 ± 10.7	29.9 ± 11.4	P=0.829
Sex	Men	17	16	P=0.861
	Women	1	2	
Marital status	Married	10	7	P=0.513
	Single	8	11	
Education level	Under diploma	11	9	P=0.07
	Diploma and higher	7	9	

Information about patient’s physiologic parameters before and after intervention in patients in group “A” and “B” showed in tables two to five.

Table 2: Patients heart rate before and after intervention

Time	Group “A”	Group “B”	P value
Before intervention	88.44±16.1	87.72±18.3	0.875
Immediately after intervention	85.87±18.1	86.50±15.3	
30 minute after intervention	84.22±18.8	88.89±15.9	

Table 3: Patients systolic blood pressure before and after intervention

Time	Group “A”	Group “B”	P value
Before intervention	128.67±17.1	122.10±15.3	0.330
Immediately after intervention	128.10±18.1	120.78±15.3	
30 minute after intervention	126.67±19.1	120.3±16.3	

Table 4: Patients diastolic blood pressure before and after intervention

Time	Group “A”	Group “B”	P value
Before intervention	76.33±10.2	70.56±15.6	0.335
Immediately after intervention	75.78±11.5	70.94±14.1	
30 minute after intervention	76.10±12.4	70.3±14.9	

Table 5: Patients oxygen saturation before and after intervention

Time	Group “A”	Group “B”	P value
Before intervention	98.11±1.4	97.83±2.2	0.284
Immediately after intervention	96.44±5.4	98.50±1.5	
30 minute after intervention	96.50±4.4	98.39±1.7	

4. DISCUSSION

Admission to ICUs is a painful and stressful experience. High level of stress and anxiety may be affect critically ill patients hemodynamic situation negatively. Several strategies (especially pharmacological base) used by clinician to relief patient’s pain, decrease anxiety and stress to prevent adverse effect. However independent nursing interventions known as alternative therapeutics such as muscle relaxation, cold gel pack, massages therapy, Transcutaneous Electrical Nerve

Stimulation (TENS), electroacupuncture and prayer are used to help satisfy the patients' physical, emotional and psychological needs [8, 9, 10, 11, 12, 13, 14]. In present study, we used music as a non-pharmacologic method with this hypothesis that music distracts patients' attention and decreases their heart rate, blood pressure, body temperature, and respiratory rate [15]. According to finding of present study, listening to preferred music has not negative effect on critically ill patients' hemodynamic parameter.

Previous study in this regards limited to few studies that showed similar findings. In one study in this regards in 2010, Han et al., examined the effects of music therapy on the physiological stress response and the anxiety level of mechanically ventilated patients who admitted to a china ICU. They randomly assigned 137 patients to three group includes: a) music listening group b) headphone group and c) control group). Results of Han et al., study showed reduction in physiological stress response (heart rate and respiratory rate) over time in music listening group ($p < 0.001$ for both variables) and a significant increase in heart rate and respiratory rate over time in control group ($p < 0.001$ and $p = 0.032$). Han et al., concluded that short-term therapeutic effects of music listening results in substantial reduction in physiological stress responses arising from anxiety in mechanically ventilated patients who admitted to ICUs [16]. In other study in this regards, Shokati Ahmad Abad et al., examined the effect of listening to preferred music on intensity of pain and physiologic parameters in patients undergoing coronary artery bypass grafting surgery. They randomly assigned 50 patients who were under undergoing coronary artery bypass grafting surgery to three groups includes: a) music listening group (patients in this group received preferred music two time per day) and b) control group. Results of Shokati Ahmad Abad et al., study showed that patients who listened to their preferred music experienced lower level of pain in compared to patients in control group. Results of Shokati Ahmad Abad et al., study also showed that heart rate and respiratory rate decreased significantly in patients who listened to their preferred music [17]. In another study in 2014, Zolfaghari et al., examined the effect of listening to preferred music on physiological parameters in unconscious patients who admitted to ICUs. With using convenience sampling method they randomly allocated 72 patients into two groups (intervention and control groups). Critically ill patients in intervention group listened to music selected by their family members for 30 minutes a day for three consecutive days. Patients in control group received usual care. Results of Zolfaghari et al., study showed significant decrease in patients' systolic blood pressure, and mean blood pressure that were in intervention group. They also reported a significant increase of heart rate among patients in intervention group [18].

5. CONCLUSION

Music has not negative effect on physiologic parameters of head injury patients. Music is should be considered by clinicians as a non-pharmacological, non-invasive, simple, cheap, safe, and effective method for reliving patients distress in severe head injury patients in ICUs. Further study in this regards recommended.

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